Compressional and Shear Wave Velocity of $MgSiO_3$-Perovskite to 8 GPa and 1000 K	X17B1

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Polycrystalline specimens of $MgSiO_3$–perovskite were synthesized in a 2000-ton uniaxial split-sphere apparatus (USSA-2000) at pressure above 24 GPa and temperatures about 1700K.

Ultrasonic interferometric measurement of $MgSiO_3$–perovskites were conducted at high pressures and temperatures using a DIA-type, cubic-anvil apparatus (SAM 85) installed on the superconducting wiggler beamline (X17B) at the National Synchrotron Light Source of the Brookhaven National Laboratory.

X-ray spectra of both the polycrystalline specimen and the NaCl surrounding medium were monitored continuously; the former provided PVT data to compliment the velocity measurements and the latter the pressure standard. Both compressional, P, and shear, S, wave velocities were measured.

The transformation of perovskite to orthoenstatite was observed at 8 GPa and 800K by monitoring X-ray diffraction from the specimen. Thus, the low temperature acoustic data were used to obtain the elastic properties of perovskite materials.

These new data provide an additional constraint on the composition and temperature of the lower mantle.